August 12, 1996

MEMORANDUM

TO: Orville D. Green, Assistant Administrator
Permits and Enforcement

FROM: Brian R. Monson, Chief
Operating Permits Bureau

SUBJECT: Issuance of Tier II Operating Permit #065-00011 to Ricks College, Rexburg

PURPOSE

The purpose of this memorandum is to satisfy the requirements of IDAPA 16.01.01 Sections 400 through 406 (Rules for the Control of Air Pollution in Idaho) for issuing Operating Permits.

PROJECT DESCRIPTION

This project is for an Operating Permit (OP) for Ricks College located in Rexburg, Idaho. Emission point sources existing at the facility are as follows: Four (4) coal-fired boilers with various capacities that range from 13 MMBtu/hr to 47 MMBtu/hr, thirteen (13) diesel emergency generators with various horsepower capacities, one (1) ash handling system, coal handling system, coal storage pile, and paved and unpaved roads. Emissions from the storage tanks, spray booths, welding machines, and laboratories (fume hoods) are included in the engineering technical analysis memorandum.

SUMMARY OF EVENTS

On June 20, 1995, the Division of Environmental Quality (DEQ) received an application for a Tier I OP. On November 6, 1996, Ricks College requested that DEQ change the facility's Tier I application to a Tier II application. On February 8, 1996, that application was determined complete. On July 1, 1996, a proposed Tier II OP was issued for public comment. No comments were received.

RECOMMENDATIONS

Based on the review of the OP application and on applicable state and federal regulations concerning the permitting of air pollution sources, the Bureau staff recommends that Ricks College, Rexburg, be issued a Tier II Operating Permit. Staff also recommends that the facility be notified in writing of the obligation to pay permit application fees for Tier II permits.

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cc: J. Johnston, EIRO
OP File Manual
Source File
COF

July 1, 1996

MEMORANDUM

TO: Brian R. Monson, Chief
Operating Permits Bureau
Permits and Enforcement

FROM: Harbi A. Elshafei, Air Quality Engineer Harbi
Operating Permits Bureau

THROUGH: Susan J. Richards, Air Quality Permits Manager SJR
Operating Permits Bureau

SUBJECT: Technical Analysis for Tier II Operating Permit #065-00011
Ricks College, Rexburg, Idaho

PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 16.01.01 Sections 400 through 406 (Rules for the Control of Air Pollution in Idaho) for issuing Operating Permits.

FACILITY DESCRIPTION

Ricks College (RC), located in Rexburg, Idaho, is a Junior College. RC facility consists of four (4) Boilers, thirteen (13) emergency generators, one (1) ash handling system, two (2) diesel storage tanks, one (1) unleaded storage tank, one (1) coal storage pile (1), spray booths, welding machines, laboratories (fume hoods), and paved and unpaved roads.

PROJECT DESCRIPTION

This project is for an Operating Permit (OP) for the following existing point and fugitives emission sources.

Point Sources:

(1) Boiler #1 - Erie City Iron Works (Model: 16795 H.S.B. NO. 96564; Type: Watertube 30-18-16, 2-1/2" "VL") coal-fired with a maximum rated capacity of 13.33 MMBtu/hr or 10,000 lb steam/hr. The firing equipment for the boiler is Detroit "Vibragrate" Stoker with gravity feed. Particulate matter emissions from the boiler are controlled by a multi-clone with the following specifications: Manufacturer: Research Cattrell; Type: multiple cyclone without flyash reinjection; Model: Cyclo-Trell; Flow: 6167 acfm; Collection Efficiency: 92%; Pressure Drop: 2.5 inches of water.

The boiler was constructed in 1963. This source is not subject to NSPS rules of 40 CFR 60, Subpart Dc because it was constructed prior to the promulgation date of that subpart, which is June 9, 1989. The boiler was issued an operating permit in September 4, 1990.

Stack Design Specifications -- Boiler #1 discharges into a masonry stack with the following specifications:

Height:	100 feet (minimum)
Exit Diameter:	6.71 feet
Exit Gas Flow Rate:	38,000 acfm (at rated capacity)
Exit Temperature:	550°F

(2) Boiler #2 - Erie City Iron Works (Model: 16792 H.S.B. No. 96560; Type: Watertube 30-26-18 "VL") coal-fired with a maximum rated capacity of 26.67 MMBtu/hr or 20,000 lb steam/hr. The firing equipment for the boiler is Detroit "Vibragrate" Stoker with gravity feed. Particulate matter emissions from the boiler are controlled by a multi-clone with the following specifications: Manufacturer: Research Cattrell; Type: multiple cyclone without flyash reinjection; Model: DC-4; Flow: 6167 acfm; Collection Efficiency: 92%; Pressure Drop: 3.5 inches of water.

This source was constructed in 1963. This source is not subject to NSPS rules (refer to Boiler #1 above). The boiler was issued an operating permit in September 4, 1990.

Stack Design Specifications -- Boiler #2 discharges into a masonry stack with the following specifications:

Height:	100 feet (minimum)
Exit Diameter:	6.71 feet
Exit Gas Flow Rate:	38,000 acfm (at rated capacity)
Exit Temperature:	550°F

(3) Boiler #3 - Union Iron Works (Model: 234-28; Type: Watertube "VO") coal-fired with a maximum rated capacity of 40 MMBtu/hr or 30,000 lb steam/hr. The firing equipment for the boiler is Detroit "Vibragrate" Stoker with gravity feed. Particulate matter emissions from the boiler are controlled by a multi-clone with the following specifications: Manufacturer: Multi-Tube Enterprises; Type: multiple cyclone without flyash reinjection; Model: DC-6; Flow: 18,500 acfm; Collection Efficiency: 92%; Pressure Drop: 3.4 inches of water.

The boiler was constructed in 1966. This source is not subject to NSPS rules (refer to Boiler #1 above). The boiler was issued an operating permit in September 4, 1990.

Stack Design Specifications -- Boiler #3 discharges into a masonry stack with the following specification:

Height:	100 feet (minimum)
Exit Diameter:	6.71 feet
Exit Gas Flow Rate:	38,000 acfm (at rated capacity)
Exit Temperature:	550°F

(4) Boiler #4 - Keeler (Type : Watertube "MK") coal-fired with maximum heat input of 46.67 MMBtu/hr or 35,000 lb steam/hr. The firing equipment for the boiler is Detroit "Vibragrate" Stoker with gravity feed. Particulate matter emissions from the boiler are controlled by a multi-clone with the following specifications: Manufacturer: Zurn Industries; Type: multiple cyclone without flyash reinjection; Model: MTSA-29-9CYT-A; Flow: 22,000 acfm; Collection Efficiency: 92%; Pressure Drop: 4.0 inches of water.

The boiler was constructed in 1973. This source is not subject to NSPS rules (refer to Boiler #1 above). This source was issued an operating permit in September 4, 1990.

Stack Design Specifications -- Boiler #4 discharges into its own stack with the following specifications:

Height:	52 feet (minimum)
Exit Diameter:	3.17 feet
Exit Gas Flow Rate:	22,000 acfm (at rated capacity)
Exit Temperature:	550°F

(5) Diesel Emergency Generator #1 - Cummins (Model: NTA 855GS2; Serial #11355937). The generator's rated capacity is 300 kilowatts; 465 hp. The generator is located in the Heating Plant, Building #81. This source was constructed in 1988.

Stack Design Specifications

Height:	42 feet (minimum)
Exit Diameter:	6 inches
Exit Gas Flow Rate:	2570 acfm
Exit Temperature:	900°F

(6) Diesel Emergency Generator #2 - Onan (Model: DJC-4R/248R; Serial #1168067373). The generator's rated capacity is 12.5 kilowatts; 22 Bhp. The generator is located at the Physical Plant, Building #83. This source was constructed in 1972.

Stack Design Specifications

Height:	51 feet (minimum)
Exit Diameter:	2 inches
Exit Gas Flow Rate:	155 acfm
Exit Temperature:	120°F

(7) Diesel Emergency Generator #3 - Onan (Model: DDA-15R/1483C; Serial #F770245063). The generator's rated capacity is 30 kilowatts; 58 hp 219 cubic inch. The generator is located at Manwaring Center, Building #7. This source was constructed in 1979.

Stack Design Specifications

Height:	58 feet (minimum)
Exit Diameter:	2 feet
Exit Gas Flow Rate:	325 acfm
Exit Temperature:	120°F

(8) Diesel Emergency Generator #4 - Kohler (Model: 20R0P81; Serial #096159). The generator's rated capacity is 20 kilowatts. The generator is located in Kirkham, Building #3. This source was constructed in 1956.

Stack Design Specifications

Height:	15 feet (minimum)
Exit Diameter:	1.5 feet
Exit Gas Flow Rate:	217 acfm
Exit Temperature:	120°F

(9) Diesel Emergency Generator #5 - Kohler (Model: 34R0281 ; Serial #068814; White motor , Serial #3439831-D-2300-X208). The generator's rated capacity is 30 kilowatts. The generator is located at Hart, Building #9. This source was constructed in 1969.

Stack Design Specifications

Height:	16 feet (minimum)
Exit Diameter:	2 inches feet
Exit Gas Flow Rate:	325 acfm
Exit Temperature:	270°F

(10) Diesel Emergency Generator #6 - Kohler (Model: 30R081; Serial #433179; white engine Model #D2300X188, Serial #PG3420791). The generator's rated capacity is 30 kilowatts. The generator is located in the Auxiliary Services, Building #90. This source was constructed in 1974.

Stack Design Specifications

Height:	30 feet
Exit Diameter:	2 inches
Exit Gas Flow Rate:	325 acfm
Exit Temperature:	270°F

(11) Diesel Emergency Generator #7 - Onan (Model: RDJC-4R/14AD; Serial #D860810811). The generator's rated capacity is 15 kilowatts; 27 Bhp. The generator is located at Austin, Building #10. The source was constructed in 1986.

Stack Design Specifications

Height:	12 feet (minimum)
Exit Diameter:	1.5 inches
Exit Gas Flow Rate:	155 acfm
Exit Temperature:	220°F

(12) Diesel Emergency Generator #8 - Onan (Model: DVA-15R/29163A; Serial #BN860801758). The generator's rated capacity is 50 kilowatts. The generator located in Romney, Building #5. The source was constructed in 1986.

Stack Design Specifications

Height:	17 feet (minimum)
Exit Diameter:	3 inches
Exit Gas Flow Rate:	415 acfm
Exit Temperature:	250°F

(13) Diesel Emergency Generator #9 - Onan (Model: DEH-15R/9594D; Serial #0873634206). The generator's rated capacity is 30 kilowatts. The generator is located at the Library, Building #4. The source was constructed in 1976.

Stack Design Specifications

Height:	110 feet (minimum)
Exit Diameter:	3 inches
Exit Gas Flow Rate:	329 acfm
Exit Temperature:	100°F

(14) Diesel Emergency Generator #10 - Onan (Model: DDA-15R/21694D; Serial #1820632416). The generator's rated capacity is 30 Kilowatts, 58 hp; John Deer Motor Type 4219DF-01, Serial #605536T. The generator is located at the LSA, Building #11. The source was constructed in 1979.

stack Design specifications

Height:	48 feet (minimum)
Exit Diameter:	3 inches
Exit Gas Flow Rate:	325 acfm
Exit Temperature:	270°F

(15) Diesel Emergency Generator #11 - Olympian (Model: 94A3525-S; Serial #2014529). The generator's rated capacity is 60 Kilowatts. The generator is located at Smith Building #8. The source was constructed in 1994.

Stack Design Specifications

Height:	5 feet (minimum)
Exit Diameter:	3 inches
Exit Gas Flow Rate:	884 acfm
Exit temperature:	350°F

(16) Diesel Emergency Generator #12 - Onan (Model: RDJC-4R/20727; Serial #30772470366). The generator's rated capacity is 15 Kilowatts, 120 hp cubic inch. The generator is located at Clark, Building #6. The source was constructed in 1972.

Stack Design Specifications

Height:	12 feet (minimum)
Exit Diameter:	2 inches
Exit Gas Flow Rate:	64 acfm
Exit Temperature:	220°F

(17) Diesel Emergency Generator #13 - Onan (Model: DDA-15R/18796D; Serial #H78345267; John Deer Motor Type 4219DF-01, serial #168436-T). The generator's rated capacity is 30 Kilowatts, 58 hp 219 cubic inch. The generator is located at Snow, Building #12. The source was constructed in 1980.

Stack Design Specifications

Height:	29 feet (minimum)
Exit Diameter:	3 inches
Exit Gas Flow Rate:	325 acfm
Exit Temperature:	340°F

(18) Ash Handling System. Ash generated from burning coal in the boilers' overfeed vibragrate stokers is shaken off the end of the grate and then it falls into a collection bin beneath each boiler. Ash is manually removed from the bottom of each boiler every eight hours by opening a door at the bottom of the collection bin and pulling it out with a rake into a vacuum pneumatic conveyor, which cycles on and off every few minutes to clear the system. Ash is then drawn through the piping to a pulse jet baghouse and then collected and stored in an ash silo. The ash silo's capacity is 12 tons of ash. The ash is removed periodically from the ash silo through a rotary vane feeder which meters the ash flow into the mixer unloader, where spraying water is added to the ash before falling into dump trucks. Trucks are then covered and transported to farmers for agricultural use or to the land fill. The source was constructed in 1963.

Particulate matter emissions from the ash handling system is controlled by a baghgouse, which has the following specifications: Manufacturer: United Conveyor Corporation; Type: Pulse-Jet; Model: 65-S-84; Collection Efficiency: 99.99%; Pressure Drop: 6 inches of water; Air/ Cloth Ratio: 3.5 to 1.

Stack Design Specifications

Height:	59 feet (minimum)
Exit Diameter	12 inches
Exit Gas Flow Rate:	3000 acfm
Exit Temperature:	68°F

(19) Coal Handling System. Coal is delivered to the heating plant by trucks. Approximately one truck load of coal is delivered in the winter and two to three truck loads per week in summer. Trucks unload coal in a truck hopper and then it is stored in an indoor coal hopper and in coal bunkers that located above each boiler. Coal is conveyed to the boilers by conveyors in amount of five (5) tons per hour. The conveyors are manufactured by Stephens-Adamson, Inc.

(20) Spray Booths. There are five (5) spray booths existing at the facility. Two (2) of the booths are not used and one booth uses only a few spray cans per year. The two (2) active booths at the facility are located at the physical plant lower motor pool and at the physical plant paint shop. Chemicals used at the active spray booths are fifty (50) gallons of paint, 300 gallons of lacquer, and four (4) fifty-five (55) gallon drums of stoddards paint thinner. Air flow from the physical plant paint shop booth vent is 2000 CFM. No sulfur oxides emissions are expected to occur from the fume hoods.

(21) Welding Machines and Welding Laboratories. Welding operations are located at the physical plant and at the Austin Science building at the facility. Criteria air pollutant emissions from these welding operations are insignificant.

(22) Laboratories (Fume Hoods). There are approximately 19 fume hoods used at the facility. Each fume hood is used for an approximately 25 hours per year. Air flow rates from the fume hoods range from 300 to 1800 CFM. No sulfur oxides emissions are expected to occur from the fume hoods.

(23) Storage Tanks. There are three (3) underground storage tanks at the facility. The tanks contains No. 2 fuel oil and unleaded gasoline. Capacities of the storage tanks are as follows;

Storage Tank #1 -- 3,000 gallons
Storage Tank #2 -- 3,000 gallons
Storage Tank #3 -- 3,000 gallons

(24) Coal Storage Pile - Coal is stored off site approximately one mile southwest of the heating plant. Generally there are 3,00 to 4,000 tons stored in an open pile.

(25) Paved and unpaved Roads.

A process description is also found in the operating permit application materials.

SUMMARY OF EVENTS

On June 20, 1995, DEQ received application forms for a Tier I Operating Permit from Ricks College. On August 21, 1995, the application was determined incomplete. On October 24, 1995, a meeting was held between Ricks College staff and DEQ staff to discuss the August 21, 1995, incompleteness letter. On November 6, 1995, DEQ received a letter from Ricks College in which Ricks requested that the facility's application be classified a Tier II rather than Tier I. On December 11, 1995, DEQ received from Ricks College additional information in which the estimation of SO2 emission rates from the fuel burning equipment were based on a total coal consumption of 8,500 tons per year and on sulfur content in the coal of 0.59%. On January 9, 1996, additional information was received by DEQ to substantiate the total SO_2 emission rates from the facility's fuel burning equipment.

After reviewing all applicable federal and state rules and regulations, the application was determined administratively complete on February 8, 1996. On April 3, 1996, Ricks College requested an extension for issuance of their Tier II OP for thirty (30) days to enable them to submit additional information to DEQ. On April 16, 1996, and April 29, 1996, additional information was received by DEQ.

A public comment period has been scheduled for the proposed permit.

DISCUSSION

1. Emission Estimates

Emission estimates were provided by Ricks College and can be seen in the June 20, 1995, application and in the November 24, 1995, additional information submittal. DEQ also estimated the PM, PM-10, SO_2, NO_x, CO, and the VOC emissions by using emission factors from AP-42. Section 1.1 (Bituminous And Subbituminous Coal Combustion) was used to estimate emissions from the boilers. AP-42, Sections 3.3 (Gasoline and all Diesel Industrial Engines) and 3.4 (Large Stationary Diesel and Stationary Duel Fuel Engines) were used to estimate PM, PM-10, SO_2, NO_x, CO, and VOC emissions from the emergency generators. The calculation spreadsheet is in Appendix A.

Sulfur dioxide (SO_2) is the pollutant emitted in the greatest amount from the fuel burning equipment (i.e., boilers). Potential to emit (PTE) for SO_2 based on the maximum capacity of each boiler and on 8,760 hours of operation per year and on one percent (1%) sulfur content in the coal (as per IDAPA 16.01.01.729) is estimated to be 817 T/yr. SO_2 PTE based on the enforceable limits that are found in the facility's 1990 OP (#1000-0011-001) is estimated to be 193 T/yr. These permit limits were estimated based on coal consumption of 9,900 tons per year with one percent (1%) sulfur. The SO_2 PTE, based on the facility's enforceable limits that are found in the current OP, is greater than the 100 T/yr, the major source threshold. Ricks College chose to net out of Tier I permitting by limiting the PTE of SO_2 to a less than a 100 tons per year (T/yr).

Ricks College accepted an enforceable limit on SO_2 emissions from the four coal fired boilers based on coal consumption of 8,500 T/yr and on sulfur content in the coal of 0.60%. Based on these enforceable limits, DEQ estimated the actual SO_2 emissions resulting from coal combustion in the boilers to be 96.9 T/yr. A short-term emission limit (in lb/hr) for the criteria air pollutants (i.e., PM, PM-10, SO_2, CO, and NO_x) emitted from each boiler was established and can be seen in Appendix A of this memo. Long-term emission limits (in tons/yr) for PM, PM-10, CO, SO_2, and NO_x emitted from each of the coal fired boiler were also established as seen in Appendix A. No volatile organic compounds (VOC) emission limits were included in the OP because the PTE of that pollutant from all the boilers is 1.08 T/yr.

Compliance determination for the coal usage can be verified by monitoring and recording the coal usage for Boilers #1, #2, #3, and #4 in an annual rolling basis. The most recent two (2) years compilation of data shall be kept on-site at all times and shall be made available to Department representatives upon request.

The PTE for SO_2 from the thirteen (13) diesel emergency generators that are existing at the facility is estimated to be 0.45 T/yr, based on an annual operation for each generator of 500 hours. Ricks College indicated in the OP application that each generator is operating for a maximum of fifty (50) hours per year. Therefore, the actual SO_2 emissions from the emergency generators were estimated to be 0.045 T/yr. The actual SO_2 emissions based on operations of 500 hours per generator set per year is estimated to be 0.45 T/yr. It is assumed that the SO_2 emissions from all the emergency generators existing at the facility is small, and therefore, these emissions are not included in the Operating Permit. No emission limits were established in the OP for PM, PM-10, CO, NO_x, or VOC, because the PTE for each of these pollutants from each of the generator when operating for a maximum of 500 hrs/yr on #2 fuel oil at full capacity is below 100 T/yr.

The total allowable SO_2 emissions from the boilers and the generators at the facility is estimated to be 97.35 T/yr.

Coal burned at the facility's boilers contains waste oil. The waste oil is mixed with the coal at the mine at approximately one (1) gallon of oil per ton of coal. According to the waste oil supplier (Indian Oil Company), 75% of the waste oil is crankcase oils, with the remaining twenty-five percent (25%) being derived from transmission fluid, hydraulic fluids, and other petroleum base products. Certificate of analysis for sulfur contents, ash, and metals (i.e., arsenic, cadmium, chromium, and lead), density, and heat contents of the waste oil were supplied by Indian Oil Company. Emission calculations were done by DEQ to compare emissions of SO_2, PM, PM-10, NO_x, and CO resulting from burning coal and waste oil, based on the heat and sulfur contents of the waste oil compared with that of coal. Calculations show that emissions from the boilers for the above pollutants are greater for burning coal than that of burning waste oil. Therefore, waste oil combustion in the boilers should result in lower criteria air pollutant emissions than that of burning coal -- please refer to Appendix A of this memo for the calculations work sheet. It should be stated, however, in the Tier II OP that the sulfur content in the waste oil shall not to exceed 0.40%, as per applicant submittal. Waste oil burned shall also meet specifications as set forth in 40 CFR Part 279 (Resource Conservation and Recovery Act). This will assure that the waste oil burned are within the RCRA specifications and the sulfur content in the waste oil burned will not exceed those submitted in the OP application.

PM emissions from the fly ash handling are controlled by pneumatic system which is vented through a fabric filter which has a control efficiency of 99.99%. The amount of ash handled at the ash system is five (5) tons per hour. Emissions from the ash handling system were estimated by the applicant, based on operation of two hours per day. Emissions, as estimated by applicant, are one (1) lb/hr and 0.37 T/yr. PM emissions are assumed to be equal to PM-10 emissions.

Hazardous Air Pollutants (HAPs) emission resulting from burning coal in the boilers are estimated by DEQ and by using emission factors found in AP-42, Table 1.1-13. The HAPs emitted from the boilers which have an emission factors in AP-42 are arsenic, cadmium, lead, and formaldehyde. PTE for the arsenic, cadmium, lead, and formaldehyde are 0.436, 0.035, 0.281, and 0.078 T/yr, respectively. These HAP emissions are below the ten (10) T/yr of any HAPs or below the twenty-five (25) T/yr of a combination of two or more HAPs, the Tier I major source threshold. For more information regarding the HAPs emissions, the reader is referred to Appendix A of this memo, HAPs emission calculations worksheet. HAP emissions are not included in the Tier II OP.

The facility has three (3) storage tanks, which are associated with the emergency generators and vehicles owned by the facility. The VOC emissions from the storage tanks are assumed to be negligible because the volatility of the diesel contained in two of the tanks is very low. VOC emissions from the one unleaded fuel oil tank is assumed to be low. VOC emissions from the storage tanks are not included in the Tier II OP.

Fugitive dust emissions from coal handling system, coal storage pile, and paved and unpaved roads at the facility were not estimated. It was assumed that fugitive dust emissions from these sources will be minimum because all the roads at the facility are paved and the coal is mixed with waste oil to reduce fugitive dust. Fugitive dust emissions shall be controlled in accordance with IDAPA 16.01.01.650 of the Rules.

2. Source Testing Requirements

The facility's 1990 OP requires Ricks College to conduct an annual PM source test from each of the boiler stacks. In the Tier II OP application, Ricks College proposed to DEQ to perform a PM source testing from the boiler's stack once every three years. Review of the PM source test results that were conducted on March 1995, for Boilers #1 and #2 (operating concurrently) indicate that the average PM emissions from these two boilers were very close (i.e., 0.092 gr/dscf) to the PM grain loading limits (i.e., 0.1 gr/dscf). In addition, the collection efficiencies for each of the multi-clones operating on each of the four (4) boilers are not guaranteed by the manufacturer and these efficiencies vary with specific operating conditions and with the particle size distribution properties of the PM. Based on this information, DEQ concluded that a requirement in the Tier II OP to perform a PM source test from each of the Boilers #1, #2, #3, and #4 exhaust stacks once every two (2) years was necessary. These source test requirements are conditional upon demonstration of compliance with PM emission limits for two (2) consecutive years after the issuance of the Tier II OP.

DEQ also included in the Tier II OP a requirement to perform a source test to measure the sulfur dioxide emissions from each of the Boilers #1, #2, #3, and #4 exhaust stacks. These tests are necessary to demonstrate compliance with the Tier II OP threshold emission limits of less than or equal to 100 T/yr of SO_2; since the allowable emissions of that pollutant from the boilers is equal to 96.9 T/yr. SO_2 source tests will be conducted once during the life time of the Operating Permit.

3. Modeling

Particulate matter emissions from the coal-fired boilers at Ricks College were modeled in 1990 and the impact of PM concentrations was found to be below the National Ambient Air Quality Standards (NAAQS). Emissions from the facility are further reduced because coal consumptions for the boilers were reduced from 9,900 T/yr (limits for the 1990 OP) to 8,500 T/yr (Tier II OP limits). Also, two new multi-clones were installed and replaced the old multi-clones for Boilers #2 and #3, which further reduced the PM emissions from the boiler's stacks. Therefore, no PM diffusion modeling was performed from the boiler's stacks.

4. Area Classification

Ricks College is located in Rexburg, Madison County, Idaho. This area is located in AQCR 61. The area is classified as attainment or unclassifiable for all federal and state criteria air pollutants (i.e., PM, PM-10, CO, NO_x, O_3, and SO_2).

5. Facility Classification

The facility is not a designated facility as defined in IDAPA 16.01.01.25. The facility is classified as an A2 source because the actual emissions of SO_2 is less than 100 tons per year.

6. Regulatory Review

This operating permit is subject to the following permitting requirements:

a.	IDAPA 16.01.01.401	Tier II Operating Permit.
b.	IDAPA 16.01.01.403	Permit Requirements for Tier II Sources.
c.	IDAPA 16.01.01.404.01(c)	Opportunity for Public Comment.
d.	IDAPA 16.01.01.404.04	Authority to Revise Operating Permits.
e.	IDAPA 16.01.01.406	Obligation to Comply.
f.	IDAPA 16.01.01.470	Permit Application Fees for Tier II Permits.
g.	IDAPA 16.01.01.625	Visible Emission Limitation.
h.	IDAPA 16.01.01.650	General Rules for the Control of Fugitive Dust.
i.	IDAPA 16.01.01.675	Fuel Burning Equipment -- Particulate Matter.
j.	IDAPA 16.01.01.728	Rules For Sulfur Content of Fuels -- Distillate Fuel Oil.
k.	IDAPA 16.01.01.729	Rules For Sulfur Content of Fuels -- Coal.

FEES

Fees apply to this facility in accordance with IDAPA 16.01.01.470. The facility is subject to permit application fees for Tier II operating permits of five hundred dollars ($500.00).

RECOMMENDATIONS

Based on the review of the Operating Permit application and on applicable state and federal regulations concerning the permitting of air pollution sources, the Bureau staff recommends that Ricks College in Rexburg be issued a Tier II Operating Permit for the sources that exist at the facility. An opportunity for public comment shall be provided as required by IDAPA 16.01.01.404.01. Staff also recommends that the facility be notified of the Tier II operating permit fee requirement in writing. This fee will be applicable upon issuance of the permit.

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cc: J. Johnston, EIRO
Source File
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APPENDIX A

EMISSION ESTIMATES FOR RICKS COLLEGE

FUEL BURNING EQUIPMENT - GENERATORS

GENERATORS	GEN 1	GEN 2	GEN 3	GEN 4	GEN 5	GEN 6	GEN 7	GEN 8	GEN 9	GEN 10	GEN 11	GEN 12	GEN 13	TOTAL
LOCATION	HTNG PLANT	PHYS. PLANT	MANWARING	KIRKHAM	HART	AUX. SRVCS	AUSTIN	ROMNEY	LIBRARY	L.SCI. BLDG	SMITH	CLARK	SNOW	ALL GENSETS
CAP (KW)	3.00E+02	1.25E+01	3.00E+01	2.00E+01	3.40E+01	3.00E+01	1.50E+01	5.00E+01	3.00E+01	3.00E+01	6.00E+01	1.50E+01	3.00E+01	6.57E+02
PRIMARY FUEL	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL
FUEL RATE (MAX)														
MMBtu/HR	2.81E+00	1.17E-01	2.81E-01	1.88E-01	3.19E-01	2.81E-01	1.41E-01	4.69E-01	2.81E-01	2.81E-01	5.63E-01	1.41E-01	2.81E-01	8.18E+00
MMBtu/YR	1.41E+03	5.98E+01	1.41E+02	9.38E+01	1.59E+02	1.41E+02	7.04E+01	2.35E+02	1.41E+02	1.41E+02	2.81E+02	7.04E+01	1.41E+02	1.64E+06
OPN HR/yr	5.00E+02	5.00E+02	5.00E+02	5.00E+02	5.00E+02	5.00E+02	5.00E+02	5.00E+02	5.00E+02	5.00E+02	5.00E+02	5.00E+02	5.00E+02	5.00E+02

EMISSIONS FROM GENERATOR OPERATIONS

POLLUTANT	GEN 1	GEN 2	GEN 3	GEN 4	GEN 5	GEN 6	GEN 7	GEN 8	GEN 9	GEN 10	GEN 11	GEN 12	GEN 13	TOTAL
PARTICULATE MATTER (PM)														
E.F.(LB/MMBtu)	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01	
EM. (LB/HR)	8.72E-01	3.83E-02	8.72E-02	5.82E-02	9.89E-02	8.72E-02	4.36E-02	1.45E-01	8.72E-02	8.72E-02	1.74E-01	4.36E-02	8.72E-02	1.91E+00
EM(T/yr)-50 HRS	2.18E-02	9.09E-04	2.18E-03	1.45E-03	2.47E-03	2.18E-03	1.09E-03	3.63E-03	2.18E-03	2.18E-03	4.36E-03	1.09E-03	2.18E-03	4.77E-02
EM(T/yr)-500 HRS	2.18E-01	9.09E-03	2.18E-02	1.45E-02	2.47E-02	2.18E-02	1.09E-02	3.63E-02	2.18E-02	2.18E-02	4.36E-02	1.09E-02	2.18E-02	4.77E-01
EM(T/yr)-8760 HRS	3.82E+00	1.59E-01	3.82E-01	2.55E-01	4.33E-01	3.82E-01	1.91E-01	6.37E-01	3.82E-01	3.82E-01	7.64E-01	1.91E-01	3.82E-01	8.36E+00
SULFUR DIOXIDE														
E.F.(LB/MMBtu)	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	
EM.(LB/HR)	8.16E-01	3.40E-02	8.16E-02	5.44E-02	9.25E-02	8.16E-02	4.08E-02	1.36E-01	8.16E-02	8.16E-02	1.63E-01	4.08E-02	8.16E-02	1.79E+00
EM(T/yr)-50 HRS	2.04E-02	8.50E-04	2.04E-03	1.36E-03	2.31E-03	2.04E-03	1.02E-03	3.40E-03	2.04E-03	2.04E-03	4.08E-03	1.02E-03	2.04E-03	4.46E-02
EM(T/yr)-500 HRS	2.04E-01	8.50E-03	2.04E-02	1.36E-02	2.31E-02	2.04E-02	1.02E-02	3.40E-02	2.04E-02	2.04E-02	4.08E-02	1.02E-02	2.04E-02	4.46E-01
EM(T/yr)-8760 HRS	3.57E+00	1.49E-01	3.57E-01	2.38E-01	4.05E-01	3.57E-01	1.79E-01	5.99E-01	3.57E-01	3.57E-01	7.15E-01	1.79E-01	3.57E-01	7.82E+00
NITROGEN OXIDE (NOx)														
E.F.(LB/MMBtu)	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	3.10E+00	
EM.(LB/HR)	8.72E+00	3.83E-01	8.72E-01	5.82E-01	9.89E-01	8.72E-01	4.36E-01	1.45E+00	8.72E-01	8.72E-01	1.74E+00	4.36E-01	8.72E-01	1.91E+01
EM.(T/yr)50 HRS	2.18E-01	9.09E-03	2.18E-02	1.45E-02	2.47E-02	2.18E-02	1.09E-02	3.63E-02	2.18E-02	2.18E-02	4.36E-02	1.09E-02	2.18E-02	4.77E-01
EM(T/yr)-500 HRS	2.18E+00	9.09E-02	2.18E-01	1.45E-01	2.47E-01	2.18E-01	1.09E-01	3.63E-01	2.18E-01	2.18E-01	4.36E-01	1.09E-01	2.18E-01	4.77E+00
EM(T/yr)-8760 HRS	3.82E+01	1.59E+00	3.82E+00	2.55E+00	4.33E+00	3.82E+00	1.91E+00	6.37E+00	3.82E+00	3.82E+00	7.64E+00	1.91E+00	3.82E+00	8.36E+01
CARBON MONOXIDE (CO)														
E.F.(LB/MMBtu)	7.90E-01	7.90E-01	7.90E-01	7.90E-01	7.90E-01	7.90E-01	7.90E-01	7.90E-01	7.90E-01	7.90E-01	7.90E-01	7.90E-01	7.90E-01	
EM.(LB/HR)	2.22E+00	9.26E-02	2.22E-01	1.48E-01	2.52E-01	2.22E-01	1.11E-01	3.71E-01	2.22E-01	2.22E-01	4.45E-01	1.11E-01	2.22E-01	4.86E+00
EM.(T/yr)50 HRS	5.56E-02	2.32E-03	5.56E-03	3.71E-03	6.30E-03	5.56E-03	2.78E-03	9.26E-03	5.56E-03	5.56E-03	1.11E-02	2.78E-03	5.56E-03	1.22E-01
EM(T/yr)-500 HRS	5.56E-01	2.32E-02	5.56E-02	3.71E-02	6.30E-02	5.56E-02	2.78E-02	9.26E-02	5.56E-02	5.56E-02	1.11E-01	2.78E-02	5.56E-02	1.22E+00
EM(T/yr)-8760 HRS	9.74E+00	4.06E-01	9.74E-01	6.49E-01	1.10E+00	9.74E-01	4.87E-01	1.62E+00	9.74E-01	9.74E-01	1.95E+00	4.87E-01	9.74E-01	2.13E+01
VOLATILE ORGANIC COMPOUNDS (VOC)														
E.F.(LB/MMBtu)	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	
EM.(LB/HR)	2.25E+00	9.38E-02	2.25E-01	1.50E-01	2.55E-01	2.25E-01	1.13E-01	3.75E-01	2.25E-01	2.25E-01	4.50E-01	1.13E-01	2.25E-01	4.93E+00
EM.(T/yr)50 HRS	5.63E-02	2.35E-03	5.63E-03	3.75E-03	6.38E-03	5.63E-03	2.81E-03	9.38E-03	5.63E-03	5.63E-03	1.13E-02	2.81E-03	5.63E-03	1.23E-01
EM(T/yr)-500 HRS	5.63E-01	2.35E-02	5.63E-02	3.75E-02	6.38E-02	5.63E-02	2.81E-02	9.38E-02	5.63E-02	5.63E-02	1.13E-01	2.81E-02	5.63E-02	1.23E+00
EM(T/yr)-8760 HRS	9.86E+00	4.11E-01	9.86E-01	6.57E-01	1.12E+00	9.86E-01	4.93E-01	1.64E+00	9.86E-01	9.86E-01	1.97E+00	4.93E-01	9.86E-01	2.16E+01

RICKS COLLEGE -- Boilers EMISSIONS

BOILER #1 (Erie City); Control Equip.: Multiclone with PM Capture Efficiency of 92%.

Combustion Emissions	Pollutant	Emission Factor	Normal Coal Usage	Operation Hours	Allowable Emission Rates		Maximum Coal Usage	Potential to Emit(b)	Potential to Emit(c)
		lb/ton	T/yr	hrs/yr	lb/hr	T/yr	T/yr	T/yr	T/yr
AP-42, Table 1.1-3	PM	9.00E+00	8.95E+02	2016	4.68	4.03	4555	20.50	5.25
	PM-10	5.00E+00	8.95E+02	2016	2.60	2.24	4555	11.39	2.89
Table 1.1-1	SO2S(a)	2.28E+01	8.95E+02	2016	11.86	10.20	4555	86.55	22.78
	NOx	7.50E+00	8.95E+02	2016	3.90	3.36	4555	17.08	4.37
	CO	6.00E+00	8.95E+02	2016	3.12	2.69	4555	13.67	3.50
Table 1.1-11	VOC	5.00E-02	8.95E+02	2016	0.03	0.02	4555	0.11	0.04

BOILER #2 (Erie City); Control Equip.: Multiclone with PM Capture Efficiency of 92%.

Combustion Emissions	Pollutant	Emission Factor	Normal Coal Usage	Operation Hours	Allowable Emission Rates		Maximum Coal Usage	Potential to Emit	Potential to Emit
		lb/ton	T/yr	hrs/yr	lb/hr	T/yr	T/yr	T/yr	T/yr
AP-42, Table 1.1-3	PM	9.00E+00	1.789E+03	5040	9.27	8.05	9023	40.60	10.20
	PM-10	5.00E+00	1.789E+03	5040	5.15	4.47	9023	22.56	5.61
Table 1.1-1	SO2S(a)	2.28E+01	1.789E+03	5040	23.48	20.39	9023	171.43	44.22
	NOx	7.50E+00	1.789E+03	5040	7.73	6.71	9023	33.84	8.48
	CO	6.00E+00	1.789E+03	5040	6.18	5.37	9023	27.07	6.80
Table 1.1-11	VOC	5.00E-02	1.789E+03	5040	0.05	0.04	9023	0.23	0.08

BOILER #3 (Union Iron Works); Control Equip.: Multiclone with PM Capture Efficiency of 92%.

Combustion Emissions	Pollutant	Emission Factor	Normal Coal Usage	Operation Hours	Allowable Emission Rates		Maximum Coal Usage	Potential to Emit	Potential to Emit
		lb/ton	T/yr	hrs/yr	lb/hr	T/yr	T/yr	T/yr	T/yr
AP-42, Table 1.1-3	PM	9.00E+00	2.684E+03	1848	13.95	12.08	13578	61.10	15.45
	PM-10	5.00E+00	2.684E+03	1848	7.75	6.71	13578	33.95	8.50
Table 1.1-1	SO2S(a)	2.28E+01	2.684E+03	1848	35.34	30.60	13578	257.98	67.00
	NOx	7.50E+00	2.684E+03	1848	11.63	10.07	13578	50.92	12.85
	CO	6.00E+00	2.684E+03	1848	9.30	8.05	13578	40.73	10.30
Table 1.1-11	VOC	5.00E-02	2.684E+03	1848	0.08	0.07	13578	0.34	0.13

BOILER #4 (Keeler); Control Equip.: Multiclone with PM Control Efficiency of 92%.

Combustion Emissions	Pollutant	Emission Factor	Normal Coal Usage	Operation Hours	Allowable Emission Rates		Maximum Coal Usage	Potential to Emit	Potential to Emit
		lb/ton	T/yr	hrs/yr	lb/hr	T/yr	T/yr	T/yr	T/yr
AP-42, Table 1.1-3	PM	9.00E+00	3.132E+03	3360	16.29	14.09	15856	71.35	13.7
	PM-10	5.00E+00	3.132E+03	3360	9.05	7.83	15856	39.64	7.54
Table 1.1-1	SO2S(a)	2.28E+01	3.132E+03	3360	41.27	35.70	15856	301.26	59.1
	NOx	7.50E+00	3.132E+03	3360	13.58	11.75	15856	59.46	11.4
	CO	6.00E+00	3.132E+03	3360	10.86	9.40	15856	47.57	9.1
Table 1.1-11	VOC	5.00E-02	3.132E+03	3360	0.09	0.08	15856	0.40	0.11

(a) S is percent of sulfur in the coal. It is 0.60%, as accepted by the applicant.
(b) Potential to emit in this colum is based on the maximum capacity of each boiler, 1% sulfur contents, & 8760 hours of operations per year.
(c) Potential to emit in this colum is based on emissions that were previously permitted. Emiss. contributions: B #1 = 17%, B #2= 33%, & B #3 = 50% -- see the 1990's OP .

HAPs Emission Calculations Worksheet
Ricks College

HAPs Emissions from Coal Burned in the Boilers:

The maximum rated capacities from all four boilers = 126.7 MMBtu/hr

From AP-42, Table 1.1 - 13,

Arsenic (As) Emissions:

EF = 542-1030 lb/10^{12} Btu

= 786.0 lb/10^{12} Btu (Avg.)

$$\text{Emissions} = \frac{786.0 \text{ lb}}{10^{12} \text{ Btu}} * \frac{126.7 \text{ MMBtu}}{\text{hr}} = 0.0996 \text{ lb/hr}$$

$$\frac{0.0996 \text{ lb}}{\text{hr}} * \frac{1 \text{ Ton}}{2{,}000 \text{ lb}} * \frac{8760 \text{ hr}}{1 \text{ yr}} = 0.436 \text{ T/yr}$$

Cadmium (Cd) Emissions:

EF = 43-82 lb/10^{12} Btu

= 62.5 lb/10^{12} Btu (Avg.)

Emissions = 0.0079 lb/hr

= 0.035 T/yr

Lead (Pb) Emissions:

EF = 507 lb/10^{12} Btu

Emissions = 0.0642 lb/hr

= 0.281 T/yr

Formaldehyde (HCOH) Emissions:

EF = 140 lb/10^{12} Btu

Emissions = 0.0177 lb/hr

= 0.078 T/yr

Waste Oil Calculations Worksheet
Ricks College

Waste Oil Emissions vs. Coal Emissions from the Boilers

Coal

Heating Value = 12,925 Btu/lb

SO_2 emission factor = 38 S lb/ton -- (AP-42, Section 1.1), where S = 0.60%

SO_2 emission factor = 38(0.6) lb/ton

= 22.8 lb/ton

$$\frac{22.8\ lb}{ton} * \frac{1\ ton}{2{,}000\ lb} * \frac{1\ lb}{12{,}925\ Btu}$$

$$= 8.82 * 10^{-7}\ lb/Btu$$

$$= 8.82 * 10^{-7}\ \frac{lb}{Btu} * \frac{1 * 10^{6}\ Btu}{MMBtu}$$

SO_2 emissions = 0.88 lb/MMBtu

Waste Oil

Heating Value = 18,909 Btu/lb or 149,960 Btu/gallon

SO_2 emission factor = 147 S lb/1,000 gallon - (AP-42, Section 1.11), where S = 0.4%

SO_2 emission factor = 147(0.4) lb/1,000 gallon

= 58.8 lb/1,000 gallon

SO_2 emissions = $\frac{58.8\ lb}{1{,}000\ gallon} * \frac{1\ gal}{149{,}960\ Btu}$

= $3.92 * 10^{-7}$ lb/Btu

= 0.39 lb/MMBtu

By using similar calculations as above, emissions for PM, PM-10, NO_x, and CO from burning coal and waste oil in the boilers were obtained. A comparison of emissions is as follows:

Emissions (in lb/MMBtu)

	PM	PM-10	NO_x	CO
Coal	0.35	0.19	0.29	0.23
Waste Oil	0.08	0.07	0.13	0.03